WHAT IS CLAIMED IS:

1. An apparatus for decomposing a pollutant, comprising:

a case for housing a subject to be treated;

a light irradiation means for irradiating the subject with light; and

a light reflecting unit for reflecting the light irradiated by the light irradiation means,

wherein the light reflecting unit is arranged so as to reflect light passing through the subject to thereby irradiate the subject with the reflected light.

2. The apparatus according to Claim 1, wherein the subject to be treated comprises the pollutant and chlorine.

3. The apparatus according to Claim 1, wherein:

the case is cylindrical,

the light-reflecting surface is formed on the inner surface of the case, and

the light irradiation means is a rod-shaped light source placed at the cylindrical central axis of the case.

4. The apparatus according to Claim 3, wherein:

the case comprises a material optically opaque to

visible light, and

the light-reflecting surface is formed by mirror finishing the inner surface of the case.

5. The apparatus according to Claim 3, wherein:

the case comprises a material being optically transparent to visible light, and

the light-reflecting surface is a reflective film formed on the outer surface of the case.

6. The apparatus according to Claim 2, further comprising:

an air supply means;

a functional-water supply means; and

an aeration means, in order to bring the air into contact with the functional water.

7. The apparatus according to Claim 2, further comprising:

a polluted-air supply means;

a functional-water supply means; and

an aeration means, in order to bring a polluted air containing the pollutant into contact with the functional water.

8. The apparatus according to Claim 6, wherein the aeration means comprises an air diffuser.

9. The apparatus according to Claim 2, wherein the functional water comprises a hypochlorite ion.

10. The apparatus according to Claim 2, wherein the functional water is an acidic water formed in the vicinity of an anode by electrolysis of water containing an electrolyte.

11. The apparatus according to Claim 2, wherein the functional water is a mixture of an acidic water and an alkaline water, wherein the acidic water and the alkaline water are formed in the vicinity of an anode and in the vicinity of a cathode, respectively, by electrolysis of water containing an electrolyte.

12. The apparatus according to Claim 11, wherein the acidic water is contained in the functional water in a volume equal to or more than that of the alkaline water.

13. The apparatus according to Claim 10, wherein the electrolyte is at least one of sodium chloride and potassium chloride.

14. The apparatus according to Claim 9, wherein the functional water is an aqueous solution of a hypochlorite.

15. The apparatus according to Claim 14, wherein the hypochlorite is at least one of sodium hypochlorite and potassium hypochlorite.

16. The apparatus according to Claim 14, wherein the functional water further comprises at least one of an inorganic acid and an organic acid.

17. The apparatus according to Claim 16, wherein the functional water comprises one selected from the group consisting of hydrochloric acid, hydrofluoric acid, sulfuric acid, a phosphoric acid, a boric acid, acetic acid, formic acid, malic acid, citric acid, oxalic acid and combinations thereof.

18. The apparatus according to Claim 2, wherein the functional water has a hydrogen ion concentration (pH) of from 1 to 4, an oxidation-reduction potential of from 800 to 1500 mV, and a chlorine concentration of from 5 to 150 mg/l, where the oxidation-reduction potential is determined by using a platinum electrode as a working electrode and a

silver-silver chloride electrode as a reference electrode.

19. The apparatus according to Claim 2, wherein the functional water has a hydrogen ion concentration (pH) of from 4 to 10, an oxidation-reduction potential of from 300 to 1100 mV, and a chlorine concentration of from 2 to 100 mg/l, where the oxidation-reduction potential is determined by using a platinum electrode as a working electrode and a silver-silver chloride electrode as a reference electrode.

20. The apparatus according to Claim 1, wherein the light comprises light in the range of wavelengths of from 300 to 500 nm.

21. The apparatus according to Claim 20, wherein the light comprises light in the range of wavelengths of from 350 to 450 nm.

22. The apparatus according to Claim 1, wherein the irradiance of the light is from 10 $\mu W/cm^2$ to 10 mW/cm^2.

23. The apparatus according to Claim 22, wherein the irradiance of the light is from 50 $\mu W/cm^2$ to 5 mW/cm^2.

24. The apparatus according to Claim 1, wherein the

pollutant comprises a halogenated aliphatic hydrocarbon.

25. The apparatus according to Claim 24, wherein the halogenated aliphatic hydrocarbon is a chlorinated aliphatic hydrocarbon.

26. The apparatus according to Claim 25, wherein the chlorinated aliphatic hydrocarbon is selected from the group consisting of chloroethylene, 1,1-dichloroethylene, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, trichloroethylene, tetrachloroethylene, chloromethane, dichloromethane, trichloromethane, 1,1,1-trichloroethane and combinations thereof.

27. An apparatus for decomposing a pollutant, comprising:

a first case for housing a subject to be treated;

a light irradiation means for irradiating the subject with light; and

a second case for housing the first case and the light irradiation means, the second case having a light-reflecting surface.

28. A method of decomposing a pollutant, the method comprising the steps of:

housing a subject to be treated in a case having a light-reflecting surface;

irradiating the subject with light; and

thereby decomposing a pollutant in the subject.

29. The method according to claim 28, wherein the subject to be treated comprises the pollutant and chlorine.

30. The method according to claim 28, wherein:

the case is cylindrical;

the light-reflecting surface is formed on the inner surface of the case; and

the light is applied from a rod-shaped light source placed at the cylindrically central axis of the case.

31. The method according to claim 30, wherein:

the case is formed from a material being optically opaque to visible light; and

the light-reflecting surface is formed by mirror finishing the inner surface of the case.

32. The method according to claim 30, wherein:

the case is formed from a material optically transparent to visible light, and

the light-reflecting surface is composed of a

reflective film formed on the outer surface of the case.

33. The method according to claim 29, wherein the chlorine is obtained by bringing air into contact with the functional water.

34. The method according to claim 29, wherein the subject to be treated is obtained by bringing air containing the pollutant into contact with the functional water.

35. The method according to claim 33, wherein the air is brought into contact with the functional water by using an air diffuser.

36. The method according to Claim 29, wherein the functional water comprises a hypochlorite ion.

37. The method according to Claim 29, wherein an acidic water is used as the functional water, and wherein the acidic water is formed in the vicinity of an anode by electrolysis of water containing an electrolyte.

38. The method according to Claim 29, wherein a mixture of an acidic water and an alkaline water is used as the functional water, and wherein the acidic water and the

alkaline water are formed in the vicinity of an anode and in the vicinity of a cathode, respectively, by electrolysis of water containing an electrolyte.

39. The method according to Claim 38, wherein the acidic water is contained in the mixture in a volume equal to or more than that of the alkaline water.

40. The method according to Claim 37, wherein at least one of sodium chloride and potassium chloride is used as the electrolyte.

41. The method according to Claim 36, wherein an aqueous solution of a hypochlorite is used as the functional water.

42. The method according to Claim 41, wherein at least one of sodium hypochlorite and potassium hypochlorite is used as the hypochlorite.

43. The method according to Claim 41, wherein the functional water further comprises at least one of an inorganic acid and an organic acid.

44. The method according to Claim 43, wherein the

functional water comprises one selected from the group consisting of hydrochloric acid, hydrofluoric acid, sulfuric acid, a phosphoric acid, a boric acid, acetic acid, formic acid, malic acid, citric acid, oxalic acid and combinations thereof.

45. The method according to Claim 29, wherein the functional water has a hydrogen ion concentration (pH) of from 1 to 4, an oxidation-reduction potential of from 800 to 1500 mV, and a chlorine concentration of from 5 to 150 mg/l, where the oxidation-reduction potential is determined using a platinum electrode as a working electrode and a silver-silver chloride electrode as a reference electrode.

46. The method according to Claim 29, wherein the functional water has a hydrogen ion concentration (pH) of from 4 to 10, an oxidation-reduction potential of from 300 to 1100 mV, and a chlorine concentration of from 2 to 100 mg/l, where the oxidation-reduction potential is determined using a platinum electrode as a working electrode and a silver-silver chloride electrode as a reference electrode.

47. The method according to Claim 28, wherein the light comprises light in the range of wavelengths of from 300 to 500 nm.

48. The method according to Claim 47, wherein the light comprises light in the range of wavelengths of from 350 to 450 nm.

49. The method according to Claim 28, wherein the light is applied at an irradiance of from 10 $\mu W/cm^2$ to 10 mW/cm^2.

50. The method according to Claim 49, wherein the light is applied at an irradiance of from 50 $\mu W/cm^2$ to 5 mW/cm^2.

51. The method according to Claim 28, wherein the pollutant comprises a halogenated aliphatic hydrocarbon.

52. The method according to Claim 51, wherein the halogenated aliphatic hydrocarbon is a chlorinated aliphatic hydrocarbon.

53. The method according to Claim 52, wherein the chlorinated aliphatic hydrocarbon is selected from the group consisting of chloroethylene, 1,1-dichloroethylene, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, trichloroethylene, tetrachloroethylene, chloromethane,

dichloromethane, trichloromethane, 1,1,1-trichloroethane and combinations thereof.

54. A method of decomposing a pollutant, the method comprising the steps of:

housing a subject to be treated in a first case;

irradiating the subject with light by a light irradiation means; and

thereby decomposing a pollutant in the subject,

wherein a second case is used, the second case housing the first case and the light irradiation means and having a light-reflecting surface.

55. An apparatus for decomposing a pollutant, comprising:

a case for housing a subject to be treated, the case having a light-reflecting surface; and

a light irradiation means for irradiating the subject with light.

56. A method of decomposing a pollutant, the method comprising the steps of:

irradiating a subject to be treated with light, the subject comprising chlorine and the pollutant;

reflecting light passing through the subject; and

irradiating the subject with the reflected light reflected in the reflecting step.